



Training Program
In-Person or Self-Guided

What strength exercises should you do if you are a runner?

SUMMARY: In running, different muscles play essential roles at various speeds. At slower to moderate speeds, the quadriceps and calf muscles are primary contributors to acceleration. As speed increases, the focus shifts to increasing stride frequency, with the hip muscles becoming crucial during the swing phase. The key muscles involved include the iliopsoas, gluteus maximus, and hamstrings. However, running is a complex movement that requires the coordinated effort of multiple muscles. Other important muscles include the core muscles, hip flexors, lateral glutes, and dorsiflexors. Strengthening exercises targeting these muscles, such as squats, lunges, leg extensions, hip thrusts, bridges, resisted hip flexion, banded leg lateral raises, calf raises, toe lifts and core exercises like the planks, can improve running performance, reduce the risk of injuries, and enhance overall stability and power generation. When designing an exercise program, it's important to consider individual biomechanics and the entire kinetic chain.

What strength exercises should you do if you are a runner?

In our previous discussion, we explored the involvement of various muscles in running, particularly during different speeds. At slower to moderate running speeds, the quadriceps and plantarflexors (calf muscles) were identified as the primary contributors to the acceleration of the body's center of mass. However, as running speed increases, the muscle contribution undergoes a shift. The focus then turns towards increasing stride frequency, whereby the leg propels more forcefully through the air to achieve higher speeds. During the swing phase, the hip muscles become crucial in accelerating the hip and knee joints with greater force. The key muscles involved in this phase are the iliopsoas, gluteus maximus, and hamstrings. That being said, it is important to recognize that running is a complex movement that relies on the coordinated effort of multiple muscles and muscle groups. Therefore, it is challenging to pinpoint a single muscle as the most important during running. Instead, a combination of muscles plays essential roles in facilitating efficient and effective running. These include the quadriceps, hamstrings, gluteus maximus, calf muscles, core muscles, hip flexors, lateral glutes, and dorsiflexors.

The quadriceps and hamstrings generate power, control leg movement, and stabilize the leg. Strengthening exercises like squats, lunges, and leg presses can improve their strength. Leg extensions are a commonly prescribed exercise for runners with runner's knee because of their ability to target the quadriceps muscles. According to a study published in the Journal of Biomechanics, strengthening the quadriceps through exercises like leg extensions has been shown to improve running performance and reduce the risk of certain running-related injuries.

The gluteus maximus, the largest muscle in the buttocks, contributes to overall running power and can be targeted with exercises like hip thrusts, bridges, lunges, and deadlifts.

The calf muscles, including the gastrocnemius and soleus, provide forward propulsion during running. Strengthening exercises such as weighted calf raises can enhance their strength.

The hip flexors play a significant role in leg movement and stability during running. Exercises like banded high knee marching, banded hip flexion, and mountain climbers target these muscles.

The lateral glutes and hip abductors support proper hip mechanics. Lateral leg lifts, outer thigh machine, and banded side steps engage these muscles.

The muscles of the core, including the abdominals, obliques, and lower back muscles, provide stability and help maintain proper posture while running. Core exercises like planks, bird dogs, and Russian twists (where the twist comes from the torso) can improve core strength and force transfer between the upper and lower body. Side bridges, including the side plank and side plank with leg lift, strengthen the lateral core muscles which include the lateral hip, contributing to overall stability and control during running.

Additionally, the dorsiflexors, including the tibialis anterior, are important for lifting the toes towards the shin, aiding in foot clearance during the running stride. Strengthening exercises like toe lifts can improve dorsiflexor strength, leading to better toe clearance, enhanced running efficiency, injury prevention, improved balance, stability, and increased power generation.

These muscles and their respective exercises are supported by research in the field of biomechanics and sports science. However, it is crucial to consider the entire kinetic chain and individual biomechanics when designing an exercise program.